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Comorbidity in adolescence: simultaneous declaration of depressive, eating symptoms and use of psychoactive substances in general population of 17 year old students in a big city

Renata Modrzejewska

Summary

Aim. To determine whether the following symptoms: depressive symptoms, eating disorder symptoms among adolescents in Cracow secondary schools are associated with an increased risk of psychoactive substance use.

Method. A representative sample of the population of Krakow secondary school pupils was tested. A two-stage draw method identified a group of 2034 2nd form pupils of all types of secondary schools: grammar schools, technical schools and vocational schools (17-year olds). They were tested using the following screening questionnaires: Beck Depression Scale, EAT-26 eating disorders scale and author's drug questionnaire.

Results. The prevalence of depressive symptoms among boys and girls is associated with an increased alcohol use (74.8% among depressive boys and 65.8% in the depressive group of girls), cigarette smoking (41.7% and 46.7%) and drug use (29.0% and 18.6%). All of the relationships are statistically significant in both sexes. 41.7% of depressive boys admit to smoking, versus. only 32.6% in the non-depressive group. In the girls' group, these relationships are as follows: 46.7% versus 32.1%. The relationships are statistically significant in both sexes.

The prevalence of eating disorder symptoms among boys and girls is associated with a higher alcohol use (respectively: 73.5% and 61.9%), cigarette smoking (42.1% and. 46.9%), and drug use (31.6% and 21.5%). Compared with a group of young people without eating disorder symptoms, the relationships are of statistical significance.

Conclusions. Comorbidity of the following symptoms was found: depressive symptoms, eating disorder symptoms and symptoms of psychoactive substance use. The presence of depressive symptoms increases the risk of the use of psychoactive substances, especially alcohol and tobacco, to a lesser extent – drugs, both in the boys and in the girls. The presence of eating disorder symptoms increases the risk of smoking and drug use among both boys and girls.

epidemiological studies / comorbidity

The results of population and clinical studies indicate that the individual disorders are rare to occur in isolation. On the contrary, simultaneous occurrence of symptoms is often described that are treated as characteristic of various mental disorders and behaviour.

Renata Modrzejewska: Collegium Medicum UJ, Department of Child and Adolescent Psychiatry in Cracow, Kopernika Street 21 a, 31-501 Kraków. Correspondence address: renatam@psych.cm-uj.krakow.pl

Research into comorbidity of mental disorders has been highly popular among researchers in recent years. Data is derived from extensive studies into the general population of children and adolescents, as well as from clinical trials, conducted in groups with various diagnoses.

The consequence of research on comorbidity of mental disorders is the considerations explaining this phenomenon [1, 2, 3, 4]. There are attempts to seek a common etiology, risk factors and interactions between the disease enti-

ties tested. These attempts refer to etiological models, such as Cloninger's [5]. In the case of research into the comorbidity of diseases and mental disorders, these are called models of comorbidity. Such models are created as both global attempts to explain the phenomenon of coexistence of mental disorders, as well as explaining the cooccurrence of individual units with one another (such as anorexia nervosa and depressive disorders).

In 1991, Caron and Rutter performed a meta-analysis of studies on the coexistence of psychiatric disorders in children and adolescents. In their work, they proposed the concept of true comorbidity and presented possible explanations of this phenomenon. They proposed the coexistence of two or more actually separate disorders. Thus, comorbidity studies would have to be preceded by a thorough validation of the disorders tested, which can help determine whether they are indeed separate, or what we are dealing with is a single disorder with different manifestations of psychopathology [1].

Wittchen proposed a comorbidity model based on the search for potential causal mechanisms. He distinguished four possible explanations of the phenomenon: 1) one disorder is a predisposition towards the occurrence of other disorders (e.g. anxiety disorders predispose towards depressive disorders), 2) both disorders are a predisposition to each other (e.g., an anxiety disorder predisposes towards the occurrence of a depressive disorder and vice versa), 3) there is a common factor preceding the occurrence of both disorders (e.g., personality disorders and neuroticism for anxiety and depressive disorders), 4) there is a complex pattern of interaction of many factors that are a predisposition towards the occurrence of a specific disease or mental disorder, and in the case of concurrent diseases and disorders, one or multiple factors are shared [6, 7].

An increased risk of depressive symptoms emerging during the development begins early on in adolescence and increases with age.

Depression during development may be complicated by the abuse of psychoactive substances and may be a predisposition towards SUD – substance use disorders in young people. During adolescence, the intensity of depressive symptoms is associated with the use of substances such as cigarettes and alcohol, and is later a predisposition towards hard drug use [8].

Co-occurrence of depressive symptoms is a widely investigated phenomenon, much more so than other issues. Kandel and colleagues (1997) showed that the prevalence of depression increases from about 5% in young non-drinking people to 23.8% in adolescents who consume alcohol at least weekly, to 24.1% in adolescents admitting to the consumption of illicit drugs at least once year. They also proved the comorbidity of mood disorders with a wide range of psychoactive substance use or abuse intensity, from recent use of cigarettes to occasional use of illicit substances [9, 8].

Comorbidity of eating disorders and substance use is also widely reported in both clinical trials and population trials [10].

It is estimated that approximately 12-18% of people with disorders such as: anorexia nervosa and 30-70% of bulimia nervosa sufferers abuse alcohol, tobacco or other drugs. The research focused mainly on adult women and showed that more patients with bulimia or bulimic-type anorexia (binge/purge) abused psychoactive substances than did women with a restrictive type of anorexia and women without eating disorders [10]. In several studies among adolescents, increased tobacco use was found, as well as the use of illegal substances and alcohol, particularly in the group of patients with symptoms from the bulimia spectrum [11, 12, 13].

AIM

To determine whether the presence of the following symptoms: depressive symptoms and eating disorder symptoms in Cracow schools' adolescents are associated with an increased frequency and type of psychoactive substances used.

MATERIAL

The size of the population of 2nd form full-time secondary school students researched was 16,598. When performing the draw, the estimated prevalence of the phenomenon was 0.5, the estimate error was 0.03. Based on these assumptions, it was calculated that the minimum sample size is 1,003 students.

A sample of young people aged 17 years was randomly selected: 2nd form secondary schools - 2,034 students. A group so large was chosen because of the ability to track developments in the longitudinal study. Random sampling was used, stratified sampling - cluster sampling in the proportional variant which can be considered incomplete multistage sampling (essentially single-stage but separate for each layer) [14].

The draw included all full-time secondary schools. For secondary schools, the following were drawn: 8 state secondary schools out of 34; 9 private secondary schools out of 17; 9 technical colleges and vocational secondary schools out of 47; 7 vocational schools out of 35. All 2nd form students in the schools drawn were included in the study. The randomness was then tested using Wald-Wolfowitz runs test, finding all cases to be random. The percentage of students absent during the test was 5%. The proportions of boys and girls in all the analyses were maintained and corresponded to the gender proportions in the population of 17-year-olds – 55% of girls and 45% of boys.

METHOD

The students were tested using the following screening questionnaires: the Beck Depression Scale, the EAT-26 Eating Attitudes Test and an authors' stimulant use assessment questionnaire. The study was carried out anonymously, with questionnaires distributed all stapled together in a single notebook.

The Beck Depression Scale (Inventory) (BDI) dates back to 1961. It consists of 21 questions. It is mainly used in clinical depression studies and when assessing antidepressant effectiveness. The respondent completes it (self-esteem scale), by choosing one of four affirmative sentences describing their mood [15, 16].

The criterion for inclusion in the group is to obtain more than 15 points, according to the Kendall's recommendation for research in the untreated population [17, 18, 19].

EAT-26 is a scale developed in 1982. It was created by D. Garner and P. Garfinkel. It is a 26-item version of the scale for testing attitudes and behaviours towards eating. It is used both for researching subjects with a clinical diagnosis and as the most popular tool in screening. The author of the tool's Polish standardization is K. Włodarczyk-Bisaga [20, 21]. The criterion for inclusion in the group of high risk of eating disorders is getting 20 points or more.

Survey of medicines and substances used authors' tool for assessing the prevalence of psychoactive substance use (stimulants, drugs, substances, narcotics). Students were asked if they use and how frequently following substances: strong tea and coffee, cola, energy drinks, cigarettes, alcohol, marihuana, amphetamine, and other illicit substances and drugs. If they declared using the frequency was recorded.

Statistical methods used for data analysis

χ^2 tests were used to check the relation between variables expressed as categorical. The Spearman rank correlation were used to assess the level of correlation between the frequency of smoking, drinking and taking drugs and the depression and eating disorders scales.

Study group

1,933 copies of anonymous questionnaires were distributed among 2nd form students of all types of schools. After rejecting surveys in which respondents did not mark gender (42 people i.e. 2.2%), further statistical analysis included the following number of questionnaires: Beck's Scale 1,798 surveys (93.0%), EAT-26 scale, 1,793 (92.8%) surveys, and 1,869 medicine and substance use surveys, which accounted for 96.7% of the total number. The proportion of boys and girls in all the analyses was maintained and corresponded to the gender proportions in the population of 17-year-olds – 55% of girls and 45% of boys.

1,602 adolescents (82.9% of the initial sample, including 707 boys and 895 girls) provided information on the frequency of alcohol consumption and the occurrence of depressive symptoms. Depressive students, boys (74.8%) and girls (65.9%) alike, admitted to drinking alcohol more often than did non-depressive boys (boys 65.2% and girls 56.1%). Tests of statistical significance for both qualitative and ordinal data in the case of

girls rendered results that were statistically significant, while for boys, this was only the case for ordinal data (Spearman rank correlation coefficient r=0.079, p=0.036, bilateral test), which means that the level of depression in both sexes increases as the frequency of alcohol use increases.

1,747 high school students (90.4% of the initial sample, including 786 boys and 961 girls) provided information concerning smoking and the occurrence of depressive symptoms. More formation on drug intake and the occurrence of depressive symptoms. Depressive students, boys (29.0%) and girls (18.6%) alike, admitted to taking drugs more often than did non-depressive ones (boys 17.8% and girls 11.0%). As is the case with cigarette smoking, the relationship between depression and drug intake in both sexes is relatively weak (Spearman rank correlation coefficient, rho <0.115), although statistically significant. Tab. 3 – *next page.*

Table 1. Depression and alcohol use

Gender		Frequency of alcohol use											
		non-drinking		1x per year		1x per month		1x per week		everyday		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Boys	ND	203	34.8%	102	17.5%	154	26.4%	118	20.2%	7	1.2%	584	100.0%
	D	31	25.2%	23	18.7%	36	29.3%	29	23.6%	4	3.3%	123	100.0%
Total		234	33.1%	125	17.7%	190	26.9%	147	20.8%	11	1.6%	707	100.0%
Girls	ND	264	43.9%	136	22.6%	135	22.4%	65	10.8%	2	0.3%	602	100.0%
	D	100	34.1%	67	22.9%	76	25.9%	47	16.0%	3	1.0%	293	100.0%
Total		364	40.7%	203	22.7%	211	23.6%	112	12.5%	5	0.6%	895	100.0%

Boys chi^2 = 6.518 df=4 p = 0.164; girls chi^2 = 11.638 df=4 p = 0.020
ND – non declaring depressive symptoms, D – declaring depressive symptom

of depressive students, boys (41.7%) and girls (46.7%) alike, admitted to smoking cigarettes than did non-depressive ones (boys 32.6% and girls 32.1%). Tests of statistical significance for both qualitative and ordinal data for both sexes rendered results that were statistically significant, although the correlation was weak (Spearman rank correlation coefficient, rho <0.160).

1,728 adolescents (89.4% of the initial sample, including 763 boys and 965 girls) provided in-

1,594 high school students (82.5% of the initial sample, including 712 boys and 882 girls) provided information concerning the occurrence of eating disorder and alcohol intake symptoms. Adolescents with eating disorders, boys (73.5%) and girls (61.9%) alike, admitted to drinking alcohol more often than did those who presented no symptoms (boys 66.5% and girls 58.9%). A statistically significant relationship was obtained in the girls' group only (boys p> 0.10). Tab. 4 – *next page.*

Table 2. Depression and smoking cigarettes

Gender		Frequency of cigarette smoking											
		non-smoking		less than 1x per week		several times a week		everyday		several times a day		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Boys	ND	433	67.4%	31	4.8%	28	4.4%	24	3.7%	126	19.6%	642	100.0%
	D	84	58.3%	4	2.8%	7	4.9%	4	2.8%	45	31.3%	144	100.0%
Total		517	65.8%	35	4.5%	35	4.5%	28	3.6%	171	21.8%	786	100.0%
Girls	ND	436	67.9%	45	7.0%	39	6.1%	26	4.0%	96	15.0%	642	100.0%
	D	170	53.3%	26	8.2%	27	8.5%	12	3.8%	84	26.3%	319	100.0%
Total		606	63.1%	71	7.4%	66	6.9%	38	4.0%	180	18.7%	961	100.0%

Boys chi2 = 10.271 df=4 p = 0.036; girls chi2 = 24.148 df=4 p < 0.0005; ND – non declaring depressive symptoms, D – declaring depressive symptoms

Table. 3. Depression and drug use

Gender		Frequency of drug use											
		none		several times a year		several times a month		several times a week		everyday		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Boys	ND	514	82.2%	54	8.6%	34	5.4%	16	2.6%	7	1.1%	625	100.0%
	D	98	71.0%	16	11.6%	16	11.6%	3	2.2%	5	3.6%	138	100.0%
Total		612	80.2%	70	9.2%	50	6.6%	19	2.5%	12	1.6%	763	100.0%
Girls	ND	576	89.0%	45	7.0%	24	3.7%	2	0.3%	0	0.0%	647	100.0%
	D	259	81.4%	35	11.0%	17	5.3%	6	1.9%	1	0.3%	318	100.0%
Total		835	86.5%	80	8.3%	41	4.2%	8	0.8%	1	0.1%	965	100.0%

Boys chi^2 = 13.956, df = 4 p = 0.007; girls chi^2 = 15.416, df = 4 p = 0.004

ND – non declaring depressive symptoms, D – declaring depressive symptoms

Table 4. Eating disorders and alcohol use

Gender		Frequency of alcohol use											
		non-drinking		1x per year		1x per month		1x per week		everyday		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Boys	NEAT	222	33.5%	119	17.9%	180	27.1%	134	20.2%	8	1.2%	663	100.0%
	EAT	13	26.5%	9	18.4%	10	20.4%	15	30.6%	2	4.1%	49	100.0%
Total		235	33.0%	128	18.0%	190	26.7%	149	20.9%	10	1.4%	712	100.0%
Girls	NEAT	297	41.1%	168	23.3%	176	24.4%	79	10.9%	2	0.3%	722	100.0%
	EAT	61	38.1%	32	20.0%	34	21.3%	29	18.1%	4	2.5%	160	100.0%
Total		358	40.6%	200	22.7%	210	23.8%	108	12.2%	6	0.7%	882	100.0%

Boys chi^2 = 6.494 df=4 p = 0.165; girls chi^2 = 16.481 df=4 p = 0.002

NEAT – non declaring eating disorder symptoms, EAT – declaring eating disorder symptoms

1736 adolescents (89.8% of the initial sample, including 791 boys and 945 girls) provided information about symptoms of eating disorders and smoking cigarettes. Eating-disordered students, boys (43.1%) and girls (46.9%) alike, admitted to smoking cigarettes more often than did non-eating-disordered boys (boys 32.7% and girls 34.8%). Tests of statistical significance for both qualitative and ordinal data for both sexes rendered results that were statistically significant,

Table 5. Eating disorders and smoking

Gender		Frequency of cigarette smoking											
		non-smoking		less than 1x per week		several times a week		everyday		several times a day		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Boys	NEAT	493	67.3%	35	4.8%	28	3.8%	30	4.1%	147	20.1%	733	100.0%
	EAT	33	56.9%	0	0.0%	4	6.9%	1	1.7%	20	34.5%	58	100.0%
Total		526	66.5%	35	4.4%	32	4.0%	31	3.9%	167	21.1%	791	100.0%
Girls	NEAT	502	65.2%	57	7.4%	46	6.0%	30	3.9%	135	17.5%	770	100.0%
	EAT	93	53.1%	13	7.4%	19	10.9%	8	4.6%	42	24.0%	175	100.0%
Total		595	63.0%	70	7.4%	65	6.9%	38	4.0%	177	18.7%	945	100.0%

Boys chi^2 = 10.964, df = 4 p = 0.027; girls chi^2 = 11.579, df = 4 p = 0.021

NEAT – non declaring eating disorder symptoms, EAT – declaring eating disorder symptoms

although the correlation was weak (Spearman rank correlation coefficient, rho < 0.08).

1,719 adolescents (88.9% of the initial sample, including 770 boys and 949 girls) provided information on drug intake and the occurrence of eating-disorder symptoms. Symptom-presenting students, boys (31.6%) and girls (21.5%) alike, admitted to taking drugs more often than did adolescents without eating disorder symptoms (boys 18.7% and girls 11.5%). As is the case with cigarette smoking, the relationship between eating disorder symptoms and drug intake in both sexes is relatively weak (Spearman rank correlation coefficient, rho <0.15), although statistically significant.

ous studies show that in this age group drinking is fairly common and that a large percentage is seen of those who engage in daily alcohol consumption, i.e. are dependent [22]. This is proven by the studies presented above. The study group contains 3.3% of boys declaring depressive symptoms and 1% of girls declaring depressive symptoms who admit to drinking alcohol everyday.

41.7% of boys who declare depressive symptoms admit to smoking cigarettes, while it is only the case for 32.6% non-depressive ones. In the group of girls, the relationships are as follows: 46.7% and 32.1%. The relationships are statistically significant in both sexes. 31.3% of boys who

Table. 6. Eating disorders and drug use

Gender						Frequency of drug use							
		none		several times a year		several times a month		several times a week		everyday		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Boys	NEAT	580	81.3%	68	9.5%	41	5.8%	17	2.4%	7	1.0%	713	100.0%
	EAT	39	68.4%	4	7.0%	7	12.3%	1	1.8%	6	10.5%	57	100.0%
Total		619	80.4%	72	9.4%	48	6.2%	18	2.3%	13	1.7%	770	100.0%
Girls	NEAT	683	88.5%	53	6.9%	30	3.9%	6	0.8%	0	0.0%	772	100.0%
	EAT	139	78.5%	24	13.6%	10	5.6%	3	1.7%	1	0.6%	177	100.0%
Total		822	86.6%	77	8.1%	40	4.2%	9	0.9%	1	0.1%	949	100.0%

Boys chi^2 = 33.635 df=4 p < 0.0005; girls chi^2 = 16.297 df=4 p = 0.003
NEAT – non declaring eating disorder symptoms, EAT – declaring eating disorder symptoms

DISCUSSION

The study confirms the comorbidity of declared depressive symptoms, eating disorders and the use of certain psychoactive substances in the population of a large university town.

It was found that the presence of depressive symptoms declared among boys and girls is associated with higher percentage of alcohol users (74.8% in depressive boys and 65.9% in the group of depressive girls, respectively), smokers (42.7% and. 46.7%) and drug users (29.0% and 18.6%). Thus, when comparing a group of boys who declare depressive symptoms and non-depressive ones, the relationships are as follows: as far as alcohol is concerned – 74.8% of depressive boys drink, while in the group of non-depressive ones, the figure is only 65.2%, and in girls, respectively: 65.9% and 56.1%. All relationships are statistically significant in both sexes. Previ-

declare depressive symptoms admit to smoking cigarettes daily, with 26.3% of depressive girls. In the group of depressive boys, 3.6% admit to taking drugs everyday, but this phenomenon is not as common in the group of girls declaring depressive symptoms. These differences are statistically significant in comparison to young people without depressive symptoms.

Prospective study conducted after 15 years in the Cracow population provided information on the relationship between depressive symptoms in the girls group and the general health condition and smoking (these relationships were statistically significant) [23].

The prevalence of declared eating disorder symptoms in boys and girls is associated with alcohol consumption (respectively: 73.5% and 61.9%), and cigarette smoking (42.1% and 46.9%), drug use (31.6% and 21.5%). Compared with a group of young people who do not de-

clare symptoms of eating disorders the relationships are statistically significant. It is interesting that the presence of bulimic type eating disorder symptoms (subclinical forms of bulimia or bulimic type anorexia) is associated with daily smoking for girls and boys alike [24]. These results are similar to studies conducted in Canada by Piran [11]; they have also been confirmed in a comprehensive review of 51 studies conducted over 15 years regarding the coexistence of eating disorders and drug use made by the Holderness [10].

CONCLUSIONS

1. Comorbidity of the following declared symptoms was found: depressive symptoms and eating disorder symptoms as well as symptoms of psychoactive substance use.
2. In the presence of declared depressive symptoms higher prevalence of the psychoactive substances use was observed, especially alcohol and tobacco, to a lesser extent – drugs, both in the boys and in the girls.
3. In the presence of declared eating disorder symptoms higher prevalence of smoking and drug use among both boys and girls was observed.

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